

DESC IRP Stakeholder Advisory Group Planning Meeting

December 7, 2022

Meeting Participants

- **DESC**
 - Betty Best
 - Eric Bell
 - Andrew Walker
 - James Neely
 - John Raftery
 - Bradley Perricelli
 - Sheryl Shelton
 - Therese Griffin
 - Adam Bidwell
 - Amanda Prestage
 - Joseph Stricklin
 - Belton Zeigler
- **CRA**
 - Pat Augustine
 - David Walls
 - Jeff Plewes
 - James Russell
 - Rowen VonPlagenhoef
- **IRP Study Consultants**
 - Drew Durkee – ICF
 - Scott Robinson – Guidehouse
 - Nick Wintermantel – Astrapé
- **Advisory Group**

<ul style="list-style-type: none">○ Anthony Sandonato○ Ben Garris○ Derek Stenlik○ Earnest White○ Eddy Moore○ Emma Clancy○ Findlay Salter○ Forest Bradley Wright○ Gretchen Pool	<ul style="list-style-type: none">○ Hamilton Davis○ Helen McCracken○ Jake Duncan○ Jeff Gordon○ John Burns○ Kate Mixson○ Omari Thompson○ O’Neil O. Morgan○ Ryan Deyoe○ Scott Connuck
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Agenda

- I. Status Update & Stakeholder Feedback Received
 - DESC IRP Process & Schedule Update
 - Review of Stakeholder Homework from Session IX
- II. Study Results
 - 2023 DSM Potential Study
 - 2023 EV Study
 - 2023 Planning Reserve Margin/ELCC Study

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- III. 2023 IRP Inputs
 - New Legislation
 - Peak Demand and Energy Forecast
 - Load Forecast Scenarios
 - Commodity Fuel Price Inputs
 - New Resources
 - Candidate Resource Options
- IV. Transmission Impact Analysis
- V. Planning for Session XI and Next Steps
 - Plans for Session XI
 - Session X Homework

Meeting Minutes

Welcome and Introductions

Mr. James Russell from CRA opened the meeting and introduced the agenda for Session X, highlighting the session's focus on reviewing study results and 2023 IRP inputs.

Mr. Russell then reminded the Advisory Group to submit questions through the chat function and that Stakeholders would have an opportunity for dialogue after the initial response to their question was provided. He explained to the Advisory Group all questions submitted in chat would be answered, and that any not addressed live in the meeting would be responded to in writing on DESC's IRP Stakeholder Advisory Group website.

Status Update on DESC IRP Process & Schedule

Mr. Russell walked through the DESC IRP schedule through the remainder of the year up until June 2023. He noted that the 2023 IRP will be filed on January 30, 2023 and that the 2022 IRP Update Procedural Schedule will be ongoing in January and February. Session XI is scheduled for mid-March due to the ongoing 2022 IRP Update Procedural Schedule and 2023 IRP filing. Session XI will report on the 2023 IRP Key Takeaways and modeling results and to identify short- and long-term goals for future stakeholder engagement.

Review of Stakeholder Homework from Session IX

Mr. Russell briefly reviewed responses to stakeholder homework and paused for questions on each slide presented. Stakeholders had previously received the slides in advance and were asked to come with questions if clarification was needed on any of DESC's responses. All questions and answers from this session are documented in the Appendix Table 1: Questions 1 to 5.

Study Results

2023 DSM Potential Study

Mr. Russell introduced Mr. Drew Durkee from ICF to present updates on the 2023 DSM Potential Study.

Mr. Durkee continued the presentation. Mr. Durkee first reviewed the process in which the 2023 DSM Potential Study was conducted. He stated that ICF takes a bottom-up approach for assessing costs with DSM. Currently ICF has completed a study of technical potential, economic potential, business as usual, business as usual achievable potential, and maximum achievable potential estimates. ICF is in the process of finalizing Commission required studies and will be conducting a quality assessment on the results before handing them over to DESC.

Mr. Durkee then walked through the business as usual (BAU) results from the 2023 DSM Potential Study. He noted that certain programs, such as the Home Energy Checkup, have declines in energy savings due

to advances in the technologies being replaced in the future resulting in less of a differential. The megawatts reported in the tables are based on winter peaks rather than summer peaks in the system.

After Mr. Durkee presented both the residential and commercial case estimates for the BAU case, he moved on to discuss maximum achievable potential. Mr. Durkee stated that ICF's findings indicated that a 1% case was unachievable based on the current program savings estimates. However, ICF will be assessing the Commission ordered cases of 1%, 1.25%, 1.5%, 1.75%, and 2%. Furthermore, it is noted that this assessment will also include assumptions such as increased participation due to the Inflation Reduction Act and an increase in savings and costs based on benchmarked developed curves from the current study.

Mr. Durkee then transitioned to the demand response (DR) potential study. Mr. Durkee first reviewed the process for assessing the inputs to the DR study. ICF uses a cost-effectiveness screen of programs and derives its savings and costs from a various potential studies and simulations. ICF also has developed a customized participation model based on surveys and inputs from customers. Based on ICF's economic screening, Mr. Durkee worked with DESC to establish five scenarios along with 12 new programs to be evaluated. Mr. Durkee then presented the draft results for the high case analysis and achievable potential from the program. He noted that savings in both cost and megawatts are much higher in the near term when time-of-use programs are opt-out rather than opt-in. The analysis also showed that the majority of achievable potential comes from interruptible load.

All questions and answers from this session are documented in the Appendix Table 1: Questions 6 to 16.

2023 EV Study

Mr. Russell introduced Scott Robinson from Guidehouse to present findings from the 2023 DESC Electric Vehicle (EV) Study. Mr. Robinson continued the presentation and began by reviewing the changes that are currently occurring in the EV market. He emphasized that the combination of federal policy, automaker commitments, investment trajectories, and improving performance are driving the acceleration of EV adoption, but that supply chains and economic pressures could result in near-term slowdowns.

Mr. Robinson then compared the current DESC market forecast for EV adoption to the previous market forecasts. He noted that both growth in EV sales and charger volumes are expected to increase relative to the 2021 market forecast. Specifically, the plug-in electric vehicle (PEV) population is expected grow at a 42% compound annual growth rate through 2030 to 1M vehicles on the road by 2050. Meanwhile, medium and heavy-duty electric vehicles (MHDEV) are expected to reach ~18% penetration (19,000 vehicles) by 2050. Overall, this equates to 84% of new vehicle sales in the territory being BEV or PHEV by 2050.

Mr. Robinson then reviewed the EV charging needs that would be required by 2050. Guidehouse found that total charger volume by 2050 is expected to be over 600,000 level-2 charging ports (87%), 60,739 level-1 (9%), and about 10,000 direct current fast charging ports (DCFC), making up 4% of the total required chargers.. Mr. Robinson noted that the graphics presented include both public and private use cases bundled together. Annual energy consumption from EVs in the DESC service territory is expected to reach ~4TWh by 2050, with peak load and coincident peak reaching 1GW and 700MW, respectively in

2050. By 2050 installed capacity is expected to reach over 15,600 MW. Due to their larger capacity, DCFC is expected to disproportionately drive load impacts.

All questions and answers from this session are documented in the Appendix Table 1: Questions 17 to 18.

2023 Planning Reserve Margin/ELCC Study

Mr. Russell then introduced Nick Wintermantel from Astrapé Consulting to present findings from its DESC Resource Adequacy Study. Mr. Wintermantel continued the presentation by reviewing the planning reserve margin study, which establishes its methodology with industry standards of LOLE 0.1 days/year. Astrapé's SERVVM model captures uncertainty by using 42 years of weather history (1980-2021) with equal probability of each weather year occurring. A distribution of 5 economic load forecast errors are used, resulting in 210 load scenarios with associated probabilities. These load scenarios are then run with 80 unit outage draws to simulate a total of 16,800 hourly simulations composed of 8,760 hours each.

Mr. Wintermantel then showed modeling results that indicated winter peak load variability is inversely correlated with the minimum temperature. He highlighted that further sensitivities may need to be conducted for lower temperatures and that the current study only captures historical events. However, without a historical data point of temperatures lower than 3 degrees, it is hard to predict how the system will respond.

Mr. Wintermantel moved on to addressing how load forecasts are addressed in the SERVVM model. Historical NERC GADS data from the past 5 years are used to model outages, with no cold weather correlated outage penalty modeled as the conventional fleet has performed well historically. Mr. Wintermantel also noted that SERVVM's multi state modeling is designed to capture the tail ends of the historical outage distribution and that simple convolution methods do not typically capture these risks.

Mr. Wintermantel then reviewed how hydro and solar are included in the SERVVM model. He noted that weekly peak shaving schedules for hydro, along with hourly profiles for solar are included in the SERVVM model. Solar units also utilize data from NREL's SAM tool to pull historical hourly irradiance data. Additional sensitivities for the study included modeling the system as an island as well as high/low cold weather load response cases. Astrapé reached the conclusion that while the winter season reserve margin was binding, a 15% minimum reserve margin for the summer should also be maintained as a secondary constraint.

Mr. Wintermantel concluded his presentation with a review of the ELCC methodologies being used to model storage and solar resources on the system. He noted that capturing solar and battery together ensures any synergistic values between the two resources is considered. Mr. Wintermantel showed that the winter ELCC for solar tapered off from 2.7% to 0.5% as incremental solar increased from 100MW to 1,100 MW. Storage resources maintained their ELCC accreditation above 80%, performing better if operations were conserved for only extreme days.

All questions and answers from this session are documented in the Appendix Table 1: Questions 19 to 25.

Inputs for the 2023 IRP

New Legislation

Mr. Jim Neely continued the presentation. He first reviewed the agenda and then briefly highlighted the new legislation that was being incorporated into the 2023 IRP. Mr. Neely noted that legislative opportunities from both the Inflation Reduction Act and Infrastructure Investment and Jobs Act will be evaluated for the 2023 IRP, with actual implementation layered in as IRS guidance becomes clearer. Mr. Neely stated that DESC plans to model the production tax credits in the Inflation Reduction Act for its generic solar units and investment tax credits for generic battery storage units. DESC is also in the process of identifying and pursuing funding opportunities established in the Infrastructure Investment and Jobs Act.

Peak Demand and Energy Forecast

Mr. Bradley Perricelli continued the presentation. Mr. Perricelli highlighted how the 2023 gross summer peak forecast for DESC has increased significantly in the long term, driven primarily by projected EV growth. Meanwhile, the 2023 Gross Winter Peak Forecast is not meaningfully different than the 2022 forecast.

Load Forecast Scenarios

Mr. Perricelli then informed stakeholders that the base load forecast for the 2023 IRP was updated from the 2022 IRP Update. The 2023 load forecast includes the 0.51% total energy saving from the 2023 DSM Potential Study as well as an adjusted EV forecast from the 2023 EV Study. The 2023 IRP keeps the low and high load forecast adjustments the same as the 2022 IRP Update.

Commodity Fuel Price Inputs

Mr. Neely continued the presentation by discussing the commodity price forecast. He noted that for the 2023 commodity gas and coal prices, DESC pulled gas prices from IHS to align the sourcing of the input with the coal price sources for the forecast. Mr. Neely also emphasized that the NYMEX Henry Hub gas price and the pricing from DESC coal markets inform the first three years of the reference price forecast. Mr. Neely then reviewed DESC's CO₂ price forecast, stating that DESC has taken into account ORS's note that DESC's Base and High CO₂ sensitivities are generally lower and begin later than other utilities, as well as lower than recently proposed CO₂ legislation.

New Resources

Mr. Neely then discussed two new resources that would be modelled in the 2023 IRP. The first resource would be a shared combined cycle, which would lower costs per kW due to economies of scale and anchor a natural gas pipeline project into South Carolina's Low Country. Mr. Neely noted that new and additional gas availability is required for economic development opportunities for South Carolina.

The second resource is the inclusion of DSM as a resource option. Mr. Neely noted that DESC is required to include DSM and purchased power as a resource option in the 2023 IRP. Upon analysis of the ICF study, DESC is proposing that the Residential Time-of-Use program and Smart Thermostat Opt-In program be two selectable demand reduction resources modelled in the 2023 IRP.

Candidate Resource Options

Mr. Neely then reviewed new resource costs, noting that certain costs have been updated from what was provided on the slide. These updates include a doubling of the SMR capital costs as well as an increase in offshore wind costs due to transmission and interconnection costs. DESC is continuing to work with its Project Construction Group for updated costs to model in its 2023 IRP.

All questions and answers from this session are documented in the Appendix Table 1: Questions 26 to 34.

Transmission Impact Study

Mr. Scott Parker continued the presentation. Mr. Parker gave an update on the 2022 TIA, highlighting how cases 1-3 each evaluate the impacts of Winyah and Santee Cooper on the Wateree retirement site. For case 1, new upgrades and new transmission ties will need to be incorporated in order to offset the loss from Wateree. Mr. Parker then explained that the other cases evaluate the sensitivities surrounding the retirement of the Williams plant. One case evaluates purely replacing Williams with imports, while another considers new builds. Additional tests are still underway, but costs will be close to what was previously presented.

2023 TIA Request Draft

Mr. Bell introduced the three draft cases to stakeholders for the 2023 TIA request and asked for stakeholder feedback for each case. Each case is meant to balance the system to allow for DESC to study the scenarios in 2030 and evaluate replacement options.

All questions and answers from this session are documented in the Appendix Table 1: Questions 35 to 36.

Next Steps

Plans for Session XI

Mr. Russell continued the presentation. He stated that for the next session, the time period for feedback has been extended to now be 2 weeks before the next session to enable feedback on the 2023 IRP.

Mr. Russell concluded the meeting by thanking the Stakeholder Advisory Group for their time and reiterating that additional questions can be submitted through the Stakeholder website or emailed to DESC-IRP-Group@crai.com.

Appendix Table 1: Session VII Q&A

	Question / Comment	From	Topic	Answer
1	Making sure we have an understanding of timelines DESC feels are important in terms of making filings or determinations on new resource acquisitions.	Eddy Moore	Topics to Address at Future Sessions	Timelines for new resource acquisitions will be included in the 2023 IRP.
2	Was there a similar constraint applied to battery storage as there was for solar?	Hamilton Davis	Topics to Address at Future Sessions	No..
3	What was the rational for the solar constraints? As expressed previously, the limits used by Duke were highly contentious. I do not think it would be accurate to use historical constraints.	Hamilton Davis	Topics to Address at Future Sessions	Constraints are based on build rates in the South Carolina, Virginia and Duke service territories. DESC also considered NREL data on US build rates. Many utilities are attempting to acquire solar resources and the supply chain is not necessarily equipped to handle larger build quantities in the near term. Removing the constraint may skew the results towards a future the supply chain cannot handle. The basis of the constraint was provided to intervenors that have signed an NDA in the 2021 and 2022 IRP Update dockets within the

				spreadsheet "Basis for DESC IRP Solar Build Limitation 20220609 CONFIDENTIAL.xlsx"
4	Did DESC conduct any sensitivities on the annual solar build constraints, such as testing with a 1000MW limit?	Ryan Deyoe	Topics to Address at Future Sessions	DESC has only looked at the 300 MW annual constraint case.
5	Would DESC be open to sharing the data/workbooks supporting the solar build constraints?	Earnest White	Topics to Address at Future Sessions	The spreadsheet has already been provided in discovery. See the response to #3.
6	Are the MW savings cumulative in the bottom row of the prior slides, or does measure persistence mean that they will add up?	Eddy Moore	DSM Study	ICF Response: The MW savings provided are impacts recognized by installations occurring in that year.
7	Following on Eddy's question, what MW impacts will be input into the load forecast? Does it follow the "waterfall" that you just described?	Forest Wright	DSM Study	DESC does accumulate the MW impacts from DSM from year to year.
8	Why does HEC Tier 2 not pass PCT?	Eddy Moore	DSM Study	Incremental cost associated with the measure prevent it from passing the PCT.
9	Could DESC please provide the specific assumptions and methods used to establish the "Maximum Achievable" Scenario? Does it include programs and/or measures not in BAU?	Forest Wright	DSM Study	Please reference the minutes from EEAG Stakeholder Advisory Group Session V for ICF's response.
10	What discount rate did you use to evaluate each program?	Jake Duncan	DSM Study	5.25%

11	Do you have an idea of which utilities you will be benchmarking against?	Ryan Deyoe	DSM Study	Benchmarking against other utilities in the southeast region
12	When will assumptions and methods related to higher DSM levels be provided (for 1.25, 1.5, 1.75, 2)? This was discussed at the last two EEAGs, but to my knowledge has not yet been provided.	Forest Wright	DSM Study	DESC provided the higher DSM cases to the EEAG for review and feedback late December. Because the study found these scenarios are not achievable and as such are theoretical, they were based on benchmarked cost and savings curves to assess the cost-effectiveness.
13	It might be worth your time to look beyond the southeast to some of the industry leaders in energy efficiency, like the PNW region.	Ryan Deyoe	DSM Study	Thank you for the comment; CRA has passed it along to ICF.
14	Why did attic insulation savings drop by 50% from the table that we reviewed?	Eddy Moore	DSM Study	Stakeholders are requested to work through the EEAG and provide specific metrics/details of the 2023 DSM Potential Study that they wish to discuss further with ICF.
15	How many times in the past decade has DESC met its annual EE savings goals?	Eddy Moore	DSM Study	Met 80% of its goals 5 times over the last 10 year, 91% 3 times over the last 10 years, and over 100% 2 times over the last 10 years. DESC expects there to be better alignment between actual and forecasts going forward due to changes in the established baseline.
16	Could you talk a bit about naturally occurring energy efficiency?	Ben Garris	DSM Study	Naturally occurring energy efficiency in a potential study is accounted for as part of the net-to-gross ratios.

				DESC includes naturally occurring energy efficiency outside of DSM programs. This utilizes an assumed replacement rate and incrementally accumulating energy savings per year until full customer saturation is reached.
17	Does EV modeling capture home battery growth and how that may impact peak demand?	Scott Robinson	EV Study	Study does not include EV to battery impacts on load, only demand side implications on rate structure.
18	Are you doing any of this forecasting at the substation level? Or any other geographic break out? What about specifically for DESC?	Jake Duncan	EV Study	The analysis is conducted at the census tract level (about 4,000 customers each). At the moment, most of the load is manageable and not dependent upon customer duty use cycles. Residential loads in particular tend to be highly responsive to load management. However, many of the geographic constraints also apply to system constraints. In general, Guidehouse has seen that impacts tend to be highly geographically concentrated. This will increase as fleet electrification moves to the mainstream as more vehicles use cases are widely available. Further, local impacts tend to reflect the installed capacity rather than coincident peak because simultaneous charging is more common. Guidehouse is not currently conducting circuit level impact analyses for DESC.
19	As the temperature move down from 10 to 3 to below 3, is there a sense of how load response continues, whether it is linear or if it levels out?	Derek Stenclik	PRM Study	Further sensitivities would need to be conducted to evaluate this question.

20	One comment for DESC. Given the sensitivity for cold temperatures to driven the reserve margin, in particular temperatures we haven't seen in a long time. Has DESC considered analyzing how the system would respond to temperatures this low from a bottoms-up load analysis?	Ryan Deyoe	PRM Study	DESC does not currently have a plan to address this issue specifically, but believes it has a much better basis going forward with the Astrape study.
21	Does the SERVVM modelling include events from 14-15 load shed events?	Derek Stenclik	PRM Study	SERVVM does not include 14-15 data, only the past 5 years. DESC did winterize its units after the 14-15 load shed event.
22	Just a request for the documentation in the report. Can you add a 12mo x 24hr/day table to slide 84 and one of LOLE by weather year.	Derek Stenclik	PRM Study	Additional documentation will be included in the 2023 Planning Reserve Margin Study.
23	Can you clarify the approach to storage economic arbitrage?	Derek Stenclik	PRM Study	The model has foresight into net load and can schedule battery charging and discharging based on planned outages and planned dispatch.
24	Can you clarify if the ELCC values on slide 89 for storage refer to PV+S or standalone storage? If they refer to PV+S, can Astrapé provide an equivalent slide for standalone storage?	Scott Walker	ELCC Study	The resources are standalone storage.
25	How much of the "needle" winter peak is residential heating?	Eddy Moore	ELCC Study	DESC does not have specific information in response to that question.. An educated assumption would be approximately 50%.
26	What changes does DESC expect with the ELG project development at Wateree if unsuccessful with this new shared resource?	Ben Garris	New Resource Options	The Shared Resource is part of a larger project seeking to bring natural gas transmission into South Carolina. It is an option being modelled in the 2023 IRP.

27	Can you comment on the CT cost increase and why the CC cost has decreased at the same time? The CT cost went up a lot, yet the CC costs decreased? Is the CT cost increase attributed to a smaller CT size?	Ryan Deyoe	New Resource Options	The CC cost did not decrease, but rather the MW output increased despite costs remaining the same.
28	Sorry to rehash this point. But some stuff doesn't make sense on the CC vs CT costs. The CC costs are ~20% lower. But the CT costs are 90-50% higher from previous numbers. The CC would include CTs, so how much is the size of the CC cost reduction offsetting the growth in CT costs?	Ryan Deyoe	New Resource Options	DESC cost estimates are based on the most recent bid data for projects. The CTs are frame and aero while the CCs are all large frame CTs. The cost components are not necessarily aligned.
29	Did the legislature initiate the pressure on DESC to develop a shared resource?	Eddy Moore	New Resource Options	The Shared Resource is part of a larger project seeking to bring natural gas transmission into South Carolina
30	Could you specify the SMR cost and where you got that cost? Thanks! The slide has \$6490/kW for SMR. I think you said 15k. Could you clarify? Thanks!	John Burns	New Resource Options	\$12,354/kW from DE Project Construction group.
31	Could we get a little more color on the "more efficient" assumptions related to the CC units? To Ryan's point these resources contain CTs.	Earnest White	New Resource Options	With the change in vendor and model, the CC's are more efficient than the units that were the basis of the previous cost estimates.
32	Could we please return to slide 94 again for clarification on the effect of EE on the load forecast? What effect are we seeing from energy efficiency?	Forest Wright	Load Forecasts Scenarios	The chart shows the updated effects of energy efficiency on summer peak demand based on the 2023 DSM Potential Study.
33	Can you elaborate what was meant by "Inform DESC ELG project development at Wateree if unsuccessful with permitting new resources" on slide 100? That was the source of my question/confusion as I wasn't sure what	Ben Garriss	New Resource Options	If it becomes clear that a replacement for Wateree will not be available, DESC will commit to a ELG pathway by December 31, 2025.

	would be expected to change with the ELG compliance pathway.			
34	One more follow-up on my previous question. Does "if unsuccessful permitting new resources" imply that, absent a shared combined cycle resource + upgraded pipeline infrastructure, DESC expects to proceed with ELG compliance at Wateree by 2025 instead of the VIP compliance/retirement by 2028?	Ben Garris	New Resource Options	DESC is not referring to the shared resource, but replacements identified in previous IRPs for 2028 and acquired in a procurement process. Wateree does not have 2025 VIP deadline.
35	How would DESC deal with the uncertainty of a lack of a shared resource being developed at Hampton?	Hamilton Davis	TIA Study	Each of the cases have been developed to assume at least one of the other plants remain online.
36	Is the Hampton Site a greenfield site?	Eddy Moore	TIA Study	DESC does not have specific information about Santee Cooper's site.